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ABSTRACT

Sixty-eight learning disabled and reading disabled junior high school-aged youths participated in two experiments regarding use of spatial organizers to increase prose recall. In Experiment 1, learners were required to study either a spatially organized illustration or a randomized (list format) illustration prior to hearing a related prose passage. Illustrations contained both mimetic (representational) symbols and referent labels. In Experiment 2, learners were required to study either spatially organized illustrations with or without mimetic symbols or randomized illustrations with or without mimetic symbols. All students were asked to recall the passage information and reconstruct the map. Results from both experiments indicated that spatially organized illustrations facilitated recall of related prose content and that the mimetic symbol illustration groups outperformed the labels groups. Results are discussed in terms of alterable instructional variables for mildly handicapped youths. (Author)

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Increasing Prose Recall of Mildly Handicapped Students Via Spatial Organizers

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Abstract

Sixty-eight learning disabled and reading disabled junior high school-aged youths participated in two experiments. In Experiment 1, learners were required to study either a spatially organized illustration or a randomized (list format) illustration prior to hearing a related prose passage. Illustrations contained both mimetic (representational) symbols and referent labels. In Experiment 2, learners were required to study either spatially organized illustrations with or without mimetic symbols, or randomized illustrations with or without mimetic symbols. All students were asked to recall the passage information and reconstruct the map. Results from both experiments indicated that spatially organized illustrations facilitated recall of related prose content and that the mimetic symbol illustration groups outperformed the labels groups. Results are discussed in terms of alterable instructional variables for mildly handicapped youths.

Increasing Prose Recall of Mildly Handicapped Students Via Spatial Organizers

In the past, reading programs for mildly handicapped learners emphasized the remediation of decoding deficits. Recently, however, reading comprehension instruction has gained the attention of special educators (Jenkins, Stein, & Osborn, 1981). Although research in this area with mildly handicapped learners is limited, several important variables have begun to be addressed. For example, applied studies with handicapped students have attempted to improve reading comprehension via vocabulary instruction (Jenkins, Pany, & Schreck, 1978), direct instruction (Carnine & Silbert, 1979), language comprehension (Engelmann, Haddox, Hanner, & Osborn, 1978), corrective feedback (Pany, Peters, & Mastropieri, 1982), pre-reading activities (Sachs, 1983), and strategy training (Brown & Palinscar, 1982; Wong, 1980). Another instructional variable, however, that has been examined in conjunction with prose recall is the use of various adjunct aids, including illustrations.

Investigations of the role of illustrations in prose learning have yielded equivocal results. Some researchers have found that illustrations facilitate recall of text content (Levin, 1981; Schallert, 1980), while others have found that illustrations actually interfere with text recall (Harber, 1980; Samuels, 1970). In particular, Harber (1983) has suggested that illustrations used with prose passages hinder the performance of learning disabled

students. In a recent investigation, Harber required learning disabled students to read three sets of passages that contained either no illustrations, partial illustrations, or complete illustrations. Her results indicated that the learning disabled students performed best when no illustrations were present. In fact, Harber (1983) concluded that "the presence of illustrations may be detrimental" (p. 58) for students with reading difficulties.

In contrast, Engelmann and Carnine (1982) have advocated the use of a particular form of illustration or what they refer to as visual-spatial display for increasing recall. Sprick (1979) conducted an investigation that manipulated several versions of this illustration and concluded that learners-who viewed information in the visual-spatial display recalled significantly more content than learners who viewed the information in a linear format. However, students in Sprick's study were typical elementary level students and not learning disabled students or students with reading problems. Even more recently, Darch and Carnine (1982) found that instruction via a visual-spatial display resulted in superior recall compared to control conditions. Again, however, their subjects were regular education students. In addition, Engelmann and Carnine (1982) contend that visual-spatial displays should include words and labels and not provide learners with spurious prompts such as outlines or representations of actual responses (i.e., the word 'bird' should be in the

display, but not necessarily the picture of a bird). Even more recently, Amlund, Gaffney, and Kulhavy (1985) investigated the effects of a spatially organized illustration on prose recall of below average readers. Their results indicated that students who used spatial organizers that contained pictures recalled more factual information from related prose passages. However, students who participated in that study were enrolled full-time in regular education classes and were not classified as "special" or remedial students.

In a recent review, however, Levin (1981) suggested that particular formats and types of illustrations used with prose content directly covaried with the degree of facilitation of recall. His classification system of the functions of illustrations ranged along a continuum from decoration, remuneration, motivation, reiteration, representation, organization, interpretation to transformation. Levin's overall conclusions supported the notion that the latter three functions tend to facilitate recall of related prose in increasing increments, while the former functions do not necessarily facilitate recall. While it is difficult to determine which particular form of illustration was used by Harber (1983), it does seem apparent that an organizational illustration is recommended by Engelmann and Carnine (1982), and to a degree supported by some research (Amlund, Gaffney, & Kulhavy, 1985; Darch & Carnine, 1982; Sprick, 1979). Since such results, however, provide us with

contradictory evidence, and since these investigations have not included mildly handicapped learners, several unanswered questions remain. First, it is important to determine whether specific types of illustrations will facilitate prose recall for learning disabled and reading disabled students. It is assumed that learning disabled students with reading difficulties share many characteristics with reading disabled students, and that instructional procedures for remediation are similar for both groups. Second, it is important to determine whether the presence of mimetic (representational, i.e., a picture of a pond) symbols on a spatial illustration facilitate prose recall. In the present context, therefore, can students classified as learning and reading disabled benefit from a spatially organized illustration, and does the presence of mimetic symbols facilitate prose recall?

In summary, this investigation was designed to examine the effects of map-like illustrations on the recall of related prose passages with a mildly handicapped (learning disabled and reading disabled) population. Experiment 1 examined the effects of spatial organization, while Experiment 2 further manipulated the format of the spatial organization.

EXPERIMENT 1

Method

Design and Subjects

The type of spatial organizer presentation was varied to form two treatment conditions. The design was a 2 organization

(spatial vs. random) X 2 recall measure (feature vs. nonfeature) with repeated measures on the recall factor. Twenty eighth-grade learning disabled youths who attended public schools in a large southwestern metropolitan area participated in this investigation. All subjects were classified as learning disabled and as having reading problems. All students were attending special education classes for reading instruction. The 13 boys and 7 girls were randomly assigned to each condition.

Materials

Spatial organizer. The illustration used was an 8.5 x 11 inch (21.5 x 28 cm) two-dimensional graphic presentation of an imaginary town named "Hamlet" (see Figure 1) designed by Kulhavy, Lee, and Caterino (1985). The town was essentially rectangular in shape with a railroad running from the upper left-hand corner

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Insert Figure 1 about here

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through the center to the bottom right-hand corner. Each map had 18 separate features which were represented by a mimetic symbol that resembled the feature and a one- or two-word label. Feature names were: pond, archery, market, silos, factory, restaurant, barbershop, gas station, cemetery, woods, rocks, bridge, Palm Couth, Highway 94, Oak lane, Maple Avenue, Elm Street, and railroad. The spatial organizer presented each feature in an organized location on the map, while the randomized illustration

presented the railroad feature intact and other features and labels listed randomly on the right-hand side (see Figure 2). Amounts and types of information presented to each condition were identical, differing only in the spatial arrangement of the 18 features.

Insert Figure 2 about here

Text passage. The 300-word prose passage was read by a male at a speed of approximately 100 words per minute. The passage was titled "Hamlet" and described the origin and growth of a small town. For each feature, specific information centering on an illustration feature and an event directly associated with it were mentioned once in the passage. Following is an example of several sentences from the passage (the feature names were not emphasized in the passage): "The first pioneers stopped at a spot near the pond and camped for the night. Later, they built a cemetery as the first part of the new town. As time passed, at a spot near what is now Maple Avenue, they herded their cattle and began to bring in the red sandstone to use in building Highway 94."

Procedure

All students were seen individually by one of two female experimenters. As students entered the treatment room, they were randomly assigned a packet of material which contained both instructions and an illustration device for one of the two

conditions. When students were seated, experimenters informed them that they were about to study an illustration and a story. Students were told that studying the illustration would aid them greatly in understanding the passage to follow. Illustrations were then removed from the packets.

Students in the spatially organized group received spatially organized illustrations, while students in the randomized group received list illustrations. Each group received a five-minute direct instruction lesson on the features of the illustration. All instructions were read from prepared scripts, and experimenters began by saying: "This is a map" and proceeded to point to each feature as they said its name. Students were required to repeat feature names and to place a check mark next to each feature as it was mentioned.

Following the illustration lesson, all students listened to a tape recording of the passage two consecutive times. At the end of the second presentation of the passage, the illustration was returned to the envelop, and students were instructed to free-recall all information possible. Students' verbatim responses were recorded. Students were given three prompts (e.g., "Can you think of anything else?") and no time limit was imposed upon the task. Students were then asked to reconstruct the illustration on a plain 8.5 x 11 inch (21.5 x 28 cm) paper.

Scoring

The "Hamlet" passage was segmented into 18 feature idea units and 18 nonfeature idea units. Feature items were the actual features from the illustration (e.g., pond), while nonfeature items were the associated events mentioned only in the passage. Free recall was scored in terms of the frequency of idea units recalled. Feature elements and nonfeature (associated events) elements were scored and totalled separately for each subject. The illustration reconstruction task was scored by totalling the number of correctly drawn features on the subject-produced maps.

Results and Discussion

Free recall data were entered into a 2 organization (spatial vs. random) x 2 recall measure (feature vs. nonfeature) analysis of variance (ANOVA) with repeated measures on the recall variable and yielded significance of the organization ($F(1,18) = 7.92$, $p < .05$, and recall measure $F(1,18) = 42.67$, $p < .01$ main effects, and for the organization by recall measure interaction $F(1,18) = 7.78$, $p < .01$. The main effects demonstrated that students in the spatially organized group outperformed students in the randomized group (22% vs. 12% of all information recalled, respectively), and that feature items were recalled more frequently than nonfeature items (21% vs. 13%, respectively). A simple effects analysis on the organization by recall interaction demonstrated the effect was due to the superiority of the spatial organization group in recall feature items. Spatially organized group students recall 53% and

34% of feature and nonfeature items, respectively, while the randomized group recall 32% and 17% respectively. Table 1 displays means and standard deviations.

Insert Table 1 about here

A t-test was completed on the illustration reconstruction data and yielded significance, $t(18) = 3.06$, $p < .01$. Again, the spatially organized group recalled and reconstructed more feature items (64%) than the randomized group (43%).

Although both groups saw and heard parallel information, differing only in spatial arrangement of the features on the illustration, all results indicated that the spatially organized group outperformed the randomized group on recall of information directly related to the illustration and recall of information related to both feature and nonfeature-related information from the passage. Apparently, the spatial organization provided a schema for these learning disabled students to retain the information from the passage and to perform better on both the free recall test and the map reconstruction task.

In order to determine whether the mimetic symbols resembling the features or whether labels which represent the symbol are equally effective in facilitating recall, Experiment 2 was designed. This investigation was intended to determine whether spatial organizers with the combined mimetic symbols and labels or

with only word labels would produce equivalent recall to randomized (list form) illustrations which contained either the combined symbols or only word labels.

EXPERIMENT 2

Method

Design and Subjects

The design was a 2 organization (spatial vs. random) x 2 referent (mimetic symbol vs label) x 2 recall measure (feature vs. nonfeature) factorial design with repeated measures on the recall variable. Forty-eight junior high school-aged mildly handicapped learners attending public schools in a large southwestern metropolitan area participated in this investigation. The 30 boys and 18 girls were all classified as learning disabled with reading difficulties or as remedial readers. All were receiving special instruction in reading. Twelve students were randomly assigned to each of the four treatment conditions.

Materials

Spatial organizer. Two of the illustrations used were identical to those used in Experiment 1. In addition, two illustrations without mimetic symbols were prepared. The spatial organizer referent label contained each feature and label in its appropriate spatial location, while the randomized referent word illustration contained the labels listed randomly on the right side of the railroad label intact.

Text passage. The test passage was identical to that used in Experiment 1.

Procedure

All treatment condition procedures and scoring procedures were identical to those used in Experiment 1.

Results and Discussion

Free recall data were entered into a 2 organization (spatial vs. random) x 2 referent (mimetic symbol vs. label) x 2 recall measure ANOVA with repeated measures on the recall variable and yielded significance for the organization $F(1,44) = 10.61$, $p < .01$, for the referent, $F(1,44) = 6.84$, $p < .05$, and recall measure $F(1,44) = 62.61$, $p < .01$ main effects, and for the referent by recall measure interaction $F(1,44) = 6.36$, $p < .05$. The main effects demonstrated that the spatially organized group outperformed the randomized group by recalling 48% vs. 30%, respectively; that the symbol group outperformed the label group by recalling 45% vs. 32%, respectively; and that all groups recalled feature items more frequently than nonfeature items by recalling 48% vs. 34%, respectively. Table 2 displays the means and standard deviations for all conditions. A simple effects analysis on the referent by recall measure interaction verified that the effect was due to the superiority of the mimetic symbol group in recalling feature items. These findings suggest that the inclusion of symbols on the illustration resulted in recall superior to that found when only labels were used.

Insert Table 2 about here

The illustration reconstruction data were entered into a 2 organization (spatial vs. random) x 2 referent (symbol vs. labels) ANOVA which yielded significance for organization $F(1,44) = 9.06$, $p < .01$, and referent $F(1,44) = 9.62$, $p < .01$ main effects. The spatially organized group outperformed the randomized group (57% vs. 42% recall, respectively), and the mimetic symbol group outperformed the label group (58% vs. 42% recall, respectively). Again, these findings suggest that students who viewed the illustrations with mimetic symbols outperformed students who viewed them with only labels.

General Discussion

Taken together, the results of these two experiments provide support for the use of spatially organized illustrations that contain mimetic symbols for the facilitation of prose recall. These junior high school aged learning disabled and reading disabled students were able to recall significantly more prose-passage related information when they had accompanying spatially organized illustrations that contained both labels and mimetic symbols. Of utmost interest is that students who had been presented with both the spatially organized illustration and the mimetic symbols not only recalled more feature information (that is, actual information from the illustration that was also

included in the passage), but, in addition, recalled more nonfeature information from the related prose passage. In other words, these students also recalled more information from the passage that was not referred to on the illustration itself.

In addition, these results appear to support Levin's (1981) hypothesized functions of pictures and prose learning, in that these spatially organized illustrations did substantially increase prose recall. In fact, these data give no support to the supposition that this type of illustration has a hindering effect on the recall performance of this group of learning disabled and reading disabled students. Similarly, the present results suggest that the presence of mimetic symbols facilitated recall of related prose content for students in this investigation. In fact, these results raise doubt about the labels-only assumption that has been proposed for some visual-spatial displays. These findings, however, do support the contention that after exposure to a spatial organizer, recall is facilitated through the formation of a cognitive representation which learners can then use as a vehicle for storing related semantic content (Amlund, Gaffney, & Kulhavy, 1985; Dean & Kulhavy, 1981; Mastropieri & Scruggs, 1983; Schwartz & Kulhavy, 1981).

Since prose recall is a major focus of instructional programs for both learning disabled and reading disabled populations, it seems critical to examine the use of spatial organizers in facilitating that recall. These results offer a promising first

step in the direct manipulation of several versions of spatial organizers with the mildly handicapped. It is critical to point out that in the present study, the exact location of each feature on the spatially organized illustration was of little importance. Instead, it appears that simply the visual, spatial presentation of the content provided learners with a framework for hooking the new information.

Obviously, these devices are not only relatively simple instructional variables over which teachers could have direct control, but also easily adaptable to almost any prose-content area, such as science or social studies. An examination of these materials indicates that with a little ingenuity, a variety of spatial organizers could be designed and empirically tested. In summary, these data offer promising prospects for mildly handicapped youth who typically exhibit difficulty with retention of prose, and for researchers interested in isolating more specifically the concomitant variables of effective spatial organizers and illustrations.

References

Amlund, J. T., Gaffney, J., & Kulhavy, R. W. (1985). Map feature content and text recall of good and poor readers. Journal of Reading Behavior, 17, 317-330.

Brown, A. L., & Palinscar, A. S. (1982). Inducing strategic learning from texts by means of informed, self-control training. Topics in Learning and Learning Disabilities, 2, 1-17.

Carnine, D., & Silbert, J. (1979). Direct instruction reading. Columbus, OH: Merrill.

Darch, C., & Carnine, D. (1982). Content area instruction--The role of information organization, learning strategies, and task structure. Unpublished manuscript, University of Oregon.

Dean, R. S., & Kulhavy, R. W. (1981). The influence of spatial organization in prose learning. Journal of Educational Psychology, 73, 57-64.

Engelmann, S., & Carnine, D. (1982). Theory of instruction: Principles and applications. New York: Irvington.

Engelmann, S., Haddox, P., Hanner, S., & Osborn, J. (1978). Thinking basics: Corrective reading comprehension A. Chicago: Science Research Associates.

Harber, J. R. (1983). The effects of illustrations on the reading performance of learning disabled and normal children. Learning Disabilities Quarterly, 6, 55-60.

Harber, J. R. (1980). Effects of illustrations on reading performance: Implications for further LD research. Learning Disabilities Quarterly, 3, 60-70.

Jenkins, J. R., Pany, D., & Schreck, J. (1978). Vocabulary and reading comprehension: Instructional effects (Tech. Rep. No. 100). Urbana: University of Illinois, Center for the Study of Reading.

Jenkins, J. R., Stein, M. L., & Osborn, J. R. (1981). What next after decoding? Instruction and research in reading comprehension. Exceptional Education Quarterly, 2, 27-39.

Kulhavy, R. W., Lee, J. B., & Caterino, L. C. (1985). Conjoint retention of maps and related discourse. Contemporary Educational Psychology, 10, 28-37.

Levin, J. R. (1981). On functions of pictures in prose. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and cognitive processes in reading. New York: Academic Press.

Mastropieri, M. A., & Scruggs, T. E. (1983). Maps as schema for gifted learners. Roeper Review, 6(2), 107-111.

Pany, D., Peters, E. E., & Mastropieri, M. A. (1982). Effects of corrective feedback on comprehension of adolescents at two skill levels: Acquisition and fluency. Paper presented at the 60th International Convention of the Council for Exceptional Children, Houston.

Sachs, A. (1983). The effects of three prereading activities on learning disabled students' reading comprehension. Learning Disabilities Quarterly, 6, 248-251.

Samuels, S. J. (1970). Effects of pictures on learning to read, comprehension, and attitudes. Review of Educational Research, 40, 497-407.

Schallert, D. L. (1980). The role of illustrations in reading comprehension. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension (pp. 503-524). Hillsdale, NJ. Erlbaum.

Schwartz, N. J., & Kulhavy, R. W. (1981). Map features and the recall of discourse. Contemporary Educational Psychology, 6, 151-158.

Sprick, R. S. (1979). A comparison of recall scores for visual-spatial, visual-serial, and auditory presentation for intermediate grade content. Unpublished doctoral dissertation, University of Oregon.

Wong, B. Y. L. (1980). Activating the inactive learner: Use of questions/prompts to enhance comprehension and retention of implied information in learning disabled children. Learning Disabilities Quarterly, 3, 29-37.

Table 1

Means and Standard Deviations

Group	Feature	Nonfeature	Reconstruction
Spatial organized	9.6 (2.87)	6.2 (3.39)	11.5 (2.12)
Random	5.7 (2.35)	3.0 (2.26)	7.7 (3.30)

Table 2

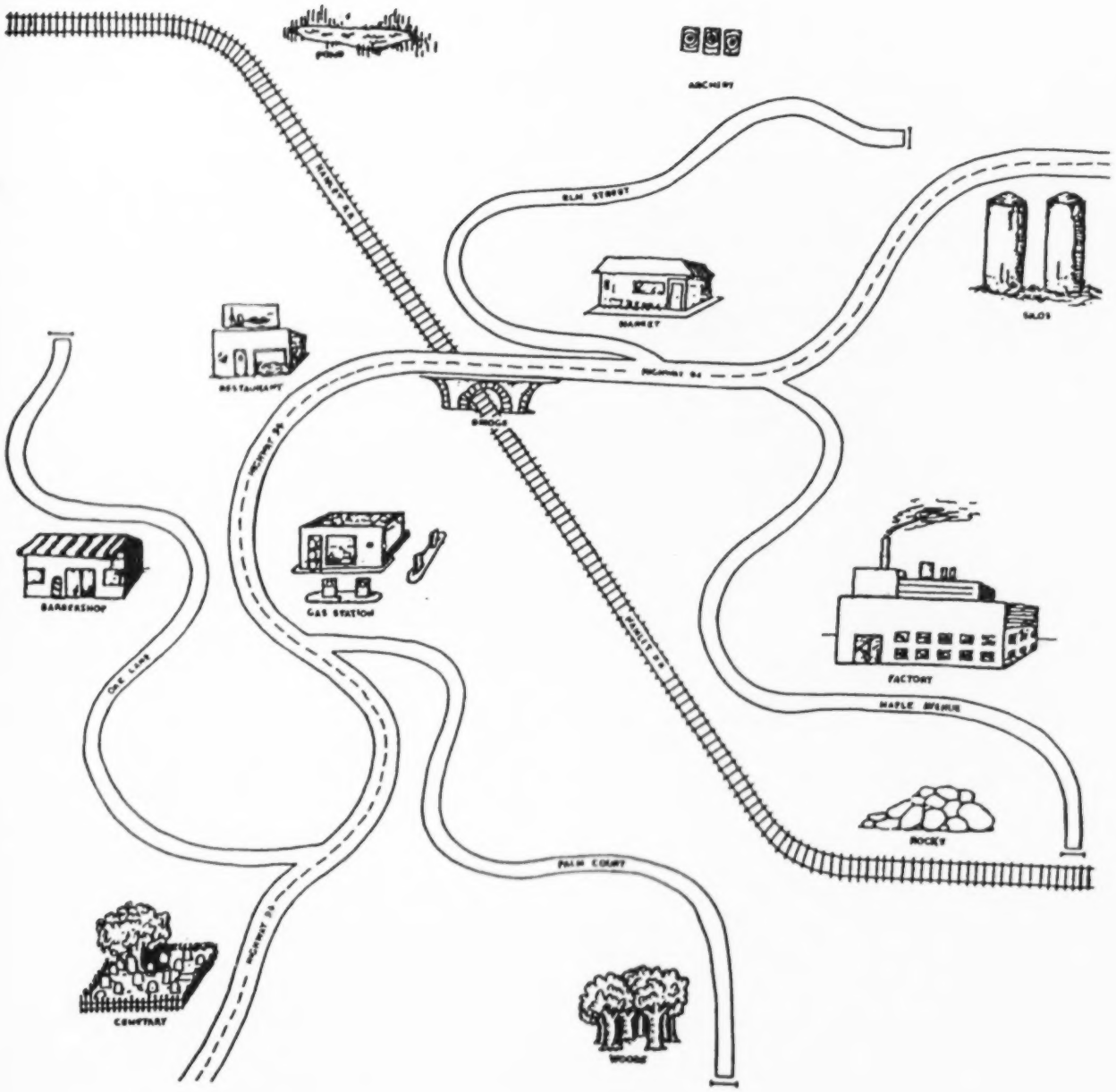
Means and Standard Deviations

Group	Feature	Nonfeature	Reconstruction
Symbols and labels spatially organized	12.2 (2.91)	8.3 (2.34)	11.3 (2.77)
Labels spatially organized	7.9 (2.99)	5.9 (3.44)	9.3 (3.39)
Symbols and labels random	8.2 (4.04)	4.4 (2.71)	9.4 (3.39)
Labels random	5.5 (2.15)	3.6 (1.67)	5.6 (3.04)

Figure Captions

Figure 1. Spatially organized Hamlet illustration.

Figure 2. Randomized, list Hamlet illustration.



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